

# PATENT SPECIFICATION

1,091,927

DRAWINGS ATTACHED.

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## COMPLETE SPECIFICATION.

### Underpressure Drilling and Tapping Apparatus.

- We, F. W. TALBOT & COMPANY LIMITED, a company organised under the laws of Great Britain, of Pitt, Near Winchester, Hampshire, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—  
5 This invention relates to underpressure drilling and tapping apparatus of the type comprising a drilling and tapping machine body adaptable temporarily to be secured to a pipe to be drilled and tapped.  
10 When fixing the machine body to the pipe with previously known apparatus, an appropriate length of chain is passed round the pipe and secured to the hooks, and by tightening the nuts on the shanks of these hooks, the chain is put in tension, so as to  
15 secure the machine body to the pipe. The chain, being of metal, is satisfactory for attaching the machine body to metal pipes with pipe walls of suitable strength and thickness, but it has been found unsuitable  
20 in its known form for use with pipes with thin walls or pipes of other materials, such as plastics, because the tension required in the chain to secure the machine body to the pipe effectively, distorts the pipe or causes  
25 the chain to cut into the material of the pipe. Moreover, the scratching or indenting of plastics material makes them liable to failure because some of these materials are prone to "scratch failure", that is to say,  
30 by scratching or indenting the surface, the material can be snapped relatively easily.  
35 The object of this invention is to overcome this unsatisfactory feature of the chain attachment.  
40 According to the present invention, underpressure drilling and tapping apparatus of the type described, includes two pulling up

hooks or like devices depending from the machine body, and flexible tension means arranged to be connected to the hooks or like members adapted to clamp the machine body to the pipe, said flexible tension means presenting, for contact with the pipe, a smooth surface. 45

In one embodiment, the tension means may comprise a strap or band integrally presenting the smooth surface. In order to allow the machine body to be fixed to pipes of different diameters, this strap or band may be provided with a series of holes at suitable centres for attachment to the pulling-up hooks referred to. These holes may be reinforced by eyelets of suitable material which, if of metal, can be recessed in the strap or band so as not to damage the surface of the pipe. 50  
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60

In an alternative embodiment, the tension means may comprise a chain and a lining strip which presents the smooth surface. This lining strip may either be unattached to the chain, or alternatively, it may be glued, or otherwise secured at intervals to the chain. 65

The invention will now be described with reference to the accompanying diagrammatic drawings, in which:— 70

Figure 1 is a section through a pipe showing one embodiment, and

Figures 2 and 3 are similar views showing alternative embodiments. 75

Referring to the drawings, a pipe to be drilled is shown at 1, and 2 represents the body of an underpressure drilling and tapping machine. The body 2 is provided with a cross plate 3 suitably drilled to take two pulling up hooks 4, suitably screw-threaded at their straight end to take a nut 5. A strap or band 6 (see figure 1) forms a tension device for securing the body 2 to the 80

pipe, and can be made of any suitable material such as woven nylon, terylene (Trade Mark) or similar material, or woven metal or stout webbing. This strap or band 6 is faced on both sides (for inter-changeability) with flexible material possessing frictional properties, such as leather, rubber or suitable brake lining material.

To permit the machine body 2 to be fixed to pipes of different diameters the strap or band is provided with a series of holes 7 at suitable centres for attachment to the pulling up hooks 4. These holes 7 may be reinforced with eyelets (not shown) made of a material which, if metal, is recessed in the strap or band 6 so as not to damage the surface of the pipe 1.

The frictional properties of the facing material will assist in securing the machine body 2 to the pipe 1 and reduce the amount of tension or stress which would otherwise be necessary in the strap 6 to secure the machine body 2 to the pipe 1. The strap 6 is of sufficient face width to reduce the unit pressure on the surface of the pipe to within permissible limits according to the material of the pipe 1, so as not to cause indentation of the external surface of the pipe 1 or distortion of the pipe 1.

The machine body 2 is fixed to the pipe 1 by attaching one end of the strap 6 to one of the pulling-up hooks 4 and selecting a suitable hole 7 in the strap 6 to suit the diameter of the pipe and attaching the strap 6 by means of this hole 7 to the other pulling-up hook 4. By screwing up the nuts 5 on the shanks of the hooks, a suitable tension can be applied to the strap 6, thus effectively securing the machine body 2 to the pipe 1 without damage to the surface of the pipe.

In an alternative arrangement shown in figure 2, a chain 11 may be used in conjunction with a lining strip 12 (made of similar material to the strap 6) to provide tensioning means to secure the body 2 to the pipe 1. The strip 12 is identical to the previously described strap 6, except that only one hole 7 is provided in the strip adjacent one end thereof for connection to a hook 4, and the other end of the strip is slotted, as at 13, to enable that end to be threaded over the other hook 4. With such an arrangement the chain is secured to the pulling-up hook 4 in the usual manner with the strip 12 interposed between the chain 11 and the surface of the pipe (figure 2) and the chain 11 will then take the tension necessary to secure the machine body 2 to the pipe 1. The slot 13 in the end of the strip 12 will permit the necessary movement between the strip and the pulling-up hook 4 during the tightening operation, and the strip itself prevents the chain 11 from damaging the surface of the pipe 1, firstly by spreading the

area of contact and thereby reducing the unit pressure on the surface of the pipe and secondly by preventing contact between the chain 11 and the surface of the pipe 1.

A further embodiment is shown in figure 3. In this embodiment, a pin-jointed or roller type bicycle chain 20 is used and a lining strip is interposed between the chain 20 and the pipe 1. The strip may be identical to the strip 12 of the figure 2 embodiment, but preferably a completely plain strip 21 is used. Because of the shape of the chain links, the pulling up hooks 4 are replaced by adapted hooks 22 designed to take the projecting ends of the pins or lugs of the chain 20. The strip in this case is made of tough rubber or similar flexible material or of the same material as the strips of the other embodiments, and it has a width equal to the width of the chain 20, and it is bonded, as at 23, to every link or a selected number of links on one side of the chain, leaving it free to expand or contract over the pin joints.

It will be appreciated that the advantage of the present invention is that the strip 6, or the chain 11 and strip 12 or chain 20 and strip 21 can be used to secure the machine body 1 to any type of pipe 1, whether it be made of plastic material or metal. Due to the smooth surface of the strap or strip contacting the pipe, no scratching can occur, and hence the chances of "scratch failure", are minimised. Furthermore, the strap and strip will act as a pad to spread the load being applied to the pipe, and hence, if it is made of thin walled metal or plastics, it is less liable to be deformed by the chain links.

#### WHAT WE CLAIM IS:—

1. Underpressure drilling and tapping apparatus of the type described including two pulling up hooks or like devices depending from the machine body, and flexible tension means arranged to be connected to the hooks or like members and adapted to clamp the machine body to the pipe, said flexible tension means presenting for contact with the pipe, a smooth surface.

2. Apparatus according to claim 1, in which the flexible tension means comprises a strap or band.

3. Apparatus according to claim 2 in which the strap or band is provided with a series of holes at suitable centres to enable the strap or band to be attached to the pulling up hooks.

4. Apparatus according to claim 3, in which the holes are reinforced by eyelets of suitable material.

5. Apparatus according to claim 1 in which the tension means comprises a chain

- and a lining strip which presents the smooth surface.
6. Apparatus according to claim 5, in which the chain is a link chain, and the lining strip is unattached thereto, the strip being provided with a hole at one end for attachment to a pulling up hook, and a slot at its other end, adapted to be passed over the other pulling up hook to enable relative movement between the strap and the pulling up hook during a tensioning operation.
7. Apparatus according to claim 5 in which the chain is a pin joint or roller type
- bicycle chain and the lining strip is secured to said chains at intervals so as to permit movement between adjacent links of the chain.
8. Underpressure drilling and tapping apparatus substantially as hereinbefore described with reference to figure 1, 2 or 3 of the accompanying drawings.

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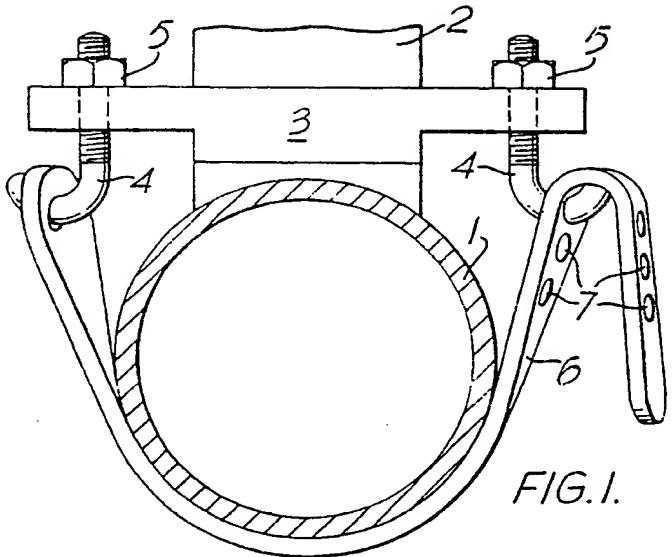


FIG.1.

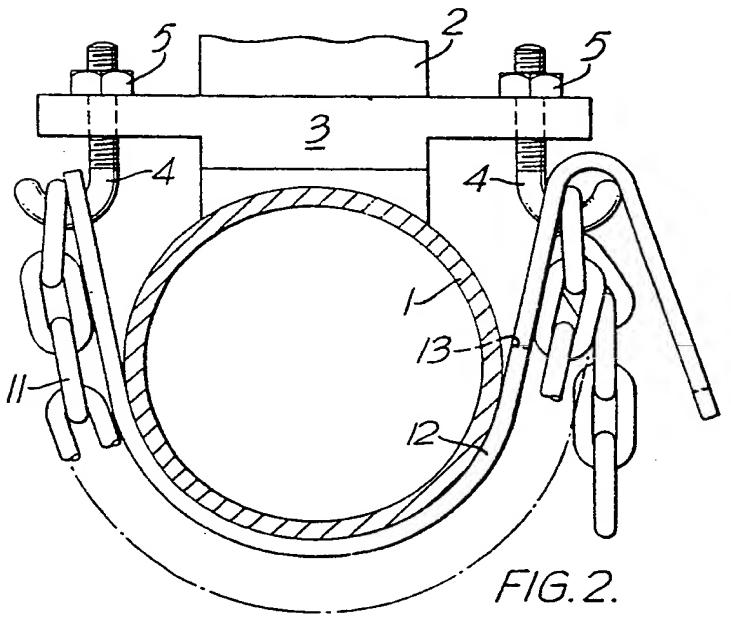


FIG.2.

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2 SHEETS *This drawing is a reproduction of  
the Original on a reduced scale  
Sheets 1 & 2*

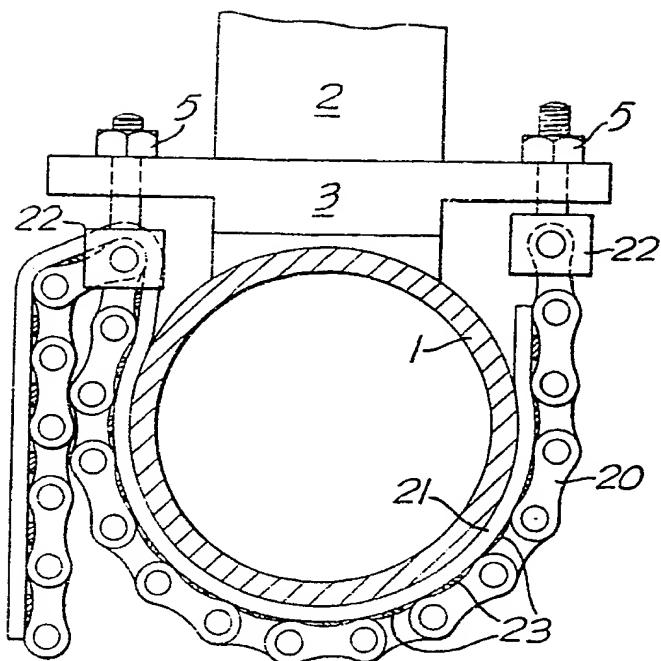


FIG. 3.

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the Original on a reduced scale  
Sheets 1 & 2

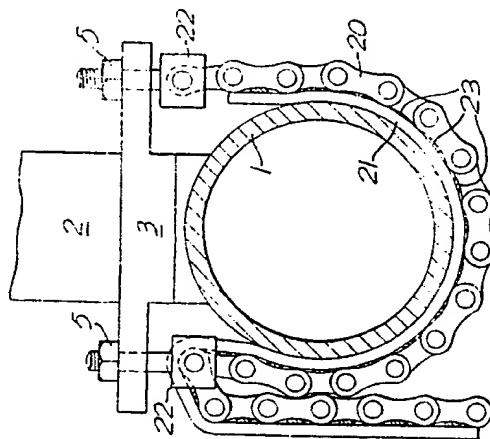


FIG.3.

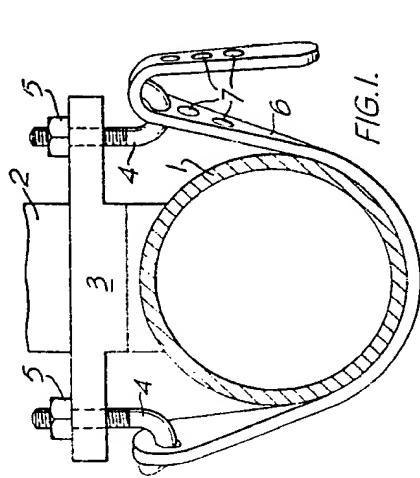


FIG.1.

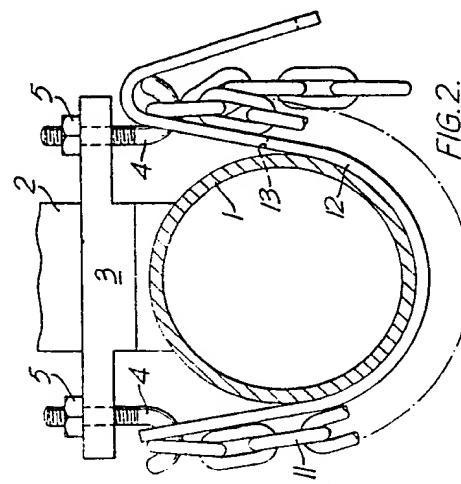


FIG.2.